WHAT IS CLAIMED:

1. A communications node in a network including a plurality of nodes, said communications node including a transceiver to transmit and receive messages and having at least one communications link with a first node of the plurality of nodes, said communications node comprising:

an electronic memory circuit having network information stored therein; and

an electronic processor circuit which (i) determines path loss information across the at least one communications link by evaluating power data corresponding to a message received from the first node; (ii) distributes the path loss information to the network; and (iii) routes messages to the network based on path loss information.

2. A communications node according to Claim 1, wherein the power data comprises a received signal strength indication (RSSI).

3. A communications node according to Claim 2, wherein said electronic processor circuit determines the path loss by subtracting the RSSI from a predetermined maximum power.

4. A communications node according to Claim 3, wherein said electronic processor circuit determines a minimum power level for transmission to the first node.

5. A communications node according to Claim 1, wherein the power data comprises a received power signal.

6. A communications node according to Claim 1, wherein the message from the first node comprises a power transmission level and said electronic processor circuit determines the path loss based at least in part on the power transmission level.

7. A communications node according to Claim 6, wherein said electronic processor circuit determines a minimum power level for transmission to the first node.

8. A communications node according to Claim 1, wherein the network includes a plurality of communication links among the plurality of nodes, and said network information comprises path loss data associated with each of the communication links.

9. A communications node according to Claim 8, wherein said electronic processor circuit routes a message through the network to a destination node via a route having a lowest path loss.

10. A communications node according to Claim 1, wherein the network information stored in said electronic memory circuit comprises trace records.

11. A communications node according to Claim 10, wherein said trace records are opaque with respect to said communications node.

12. A communications node according to Claim 10, wherein the trace records comprise operating parameters for the transceiver.

13. A communications node according to Claim 12, wherein said electronic processor circuit i) accesses the trace records through standardized software library calls via predefined common sets of names; and ii) uses predetermined software for internally manipulating predetermined trace records.

14. A method of operating a communications node in a network including a plurality of nodes, the communications node including a transceiver to transmit and receive messages, the communications node having at least one communications link with a first node of the plurality of nodes, said method comprising the steps of:

determining path loss information across the at least one communications link by evaluating power data corresponding to a received signal from the first node;

distributing the path loss information to the network; and

routing messages to the network based on path loss information.

15. A method according to Claim 14, wherein the power data comprises a received signal strength indication (RSSI).

16. A method according to Claim 15, wherein the path loss is determined by subtracting the RSSI from a predetermined maximum power.

17. A method according to Claim 16, further comprising the step of determining a minimum power level for transmission to the first node.

18. A method according to Claim 14, wherein the power data comprises a received power signal.

19. A method according to Claim 14, wherein the received signal from the first node comprises a power transmission level, and said method further comprises the

step of determining the path loss based at least in part on the power transmission level.

20. A method according to Claim 19, further comprising the step of determining a minimum power level for transmission to the first node.

21. A method according to Claim 14, wherein the network includes a plurality of communication links among the plurality of nodes, and said method further comprises the step of storing path loss data associated with at least one of the communication links.

22. A method according to Claim 21, further comprising the step of routing a message through the network to a destination node via a route having a lowest path loss.

23. A method of conserving energy in a wireless ad-hoc network, the network comprising a plurality of communication nodes, each node including a transmitter and receiver, the network including a plurality of communication links between the nodes, said method comprising the steps of:

determining energy attenuation data for messages transmitted over the links;

distributing the energy attenuation data to the communication nodes; and

determining a network routing path comprising a lowest energy path and routing a message via the lowest energy path.

24. A method of conserving energy in a wireless ad-hoc network, the network comprising a plurality of communication nodes, each node including a transmitter and receiver, the network including a plurality of communication links between the nodes, said method comprising the steps of:

determining a minimum transmission level for each of the links;

distributing the minimum transmission levels to the communication nodes; and

determining a network routing path comprising a lowest energy path based on the minimum transmission levels and routing a message via the lowest energy path.

25. In a communications system for communication in a network having a plurality of nodes, each node including transmitting and receiving means, the network including a plurality of communication paths among the

nodes, a method of operating a network comprising the steps of:

determining an energy requirement for each of the plurality of communication paths;

selecting a communications path having a lowest energy requirement to route a message; and

routing the message via the selected communications path.

26. The method according to Claim 25, wherein the energy requirement comprises path loss data.

27. The method according to Claim 25, wherein the energy requirement comprises a transmission power level.

28. In a communications system for communication in a network having a plurality of nodes, each node including transmitting and receiving means, the network including a plurality of paths among the nodes, each path comprising at least one communications link, a method of operating a network comprising the steps of:

estimating an energy requirement across each of the communications links;

distributing the energy requirements to the plurality of nodes;

routing a message over a selected communications path, the path being selected based on a total energy requirement of the path.

29. The method according to Claim 28, wherein the selected path has the lowest total energy requirement.

30. The method according to Claim 28, wherein the energy requirement comprises path loss data.

31. The method according to Claim 28, wherein the energy requirement comprises a transmission power level.

32. Computer executable code stored on a computer readable medium, the code to operate a communications router in a communications network, the network including a plurality of communication routers and a plurality of communications links, said code comprising:

code to determine energy information associated with at least some of the plurality of communication links;

code to distribute the energy information to at least some of the routers; and

code to determine a network routing path having a lowest energy based at least in part on the energy information.

33. A communications node in a network including a plurality of nodes, said communications node including a transceiver to transmit and receive messages, said communications node having at least one communications link with a first node of the plurality of nodes, said communications node comprising:

means for storing network information;

means for determining a path loss across the at least one communications link by evaluating power data corresponding to a message received from the first node;

means for distributing the path loss information to the network; and

means for routing messages to the network based on path loss information.

34. A method of operating a communications router in an ad-hoc wireless network including a plurality of routers, the method comprising the steps of:

obtaining a received signal strength indicator (RSSI) for a message received from a first router of the plurality of routers;

determining a power level requirement for a message transmission between the communications router and the first router by subtracting the RSSI from a transmission power level of the first router; and

distributing the power level requirement to at least some of the routers in the network.

35. A method according to Claim 34, wherein the power level of the first router is a predetermined power level.

36. The method according to Claim 34, wherein the power level of the first router is provided in the message from the first router.

37. The method according to Claim 34, further comprising the steps of:

receiving power level requirements from the plurality of network nodes; and

selecting routing paths based on the power level requirements so as to minimize a network energy expenditure.

38. A method of estimating instantaneous minimum transmission power to close a link in a wireless network between a first node and a second node of a plurality of communication nodes with each node including transmitting means and receiving means, said method comprising the steps of:

monitoring by the first node, transmission signals from at least the second node in the network;

filtering energy data corresponding to the transmission signal with a linear predictive filter; and

outputting from the linear predictive filter a signal corresponding to a transmission energy requirement.

39. A method according to Claim 38, wherein the energy data is a received signal strength indicator.

40. A method according to Claim 38, wherein the energy data is a received power level.

41. A method according to Claim 38, wherein the energy data is path loss data.

42. A method according to Claim 38, wherein the energy requirement is a minimal transmit power level to transmit a signal from the first node to the second node.

43. A method according to Claim 38, further comprising the step of distributing the energy requirement to the plurality of nodes.

44. A method according to Claim 38, wherein the transmission signals monitored by the first node comprise side information.

45. A method according to Claim 38, wherein the side information comprises data received from a third node of the plurality of nodes.

46. A communications node for estimating instantaneous minimum transmission power to close a link in a wireless network between said communications node and a first node of a plurality of communication nodes with each node including transmitting means and receiving means, said apparatus comprising:

means for monitoring transmission signals from at least the first node in the network; and

means for filtering energy data corresponding to the transmission signal, and for outputting a signal corresponding to a transmission energy requirement.

47. A communications node according to Claim 46, wherein the monitored transmission signals comprise side information.

48. A communications node according to Claim 47, wherein the side information comprises data received from a second node in the network.

49. A method of routing signals in a network, the network including a plurality of members, each member adapted to transmit and receive signals, said method comprising the steps of:

receiving at a first member of the plurality of members a signal transmitted from a second member of the plurality of members;

determining power data corresponding to the received signal;

calculating a transmission power level for transmitting a signal from the first member to the second member based at least in part on the power data;

distributing the transmission power level to at least some of the plurality of members; and

routing messages based at least in part on distributed transmission power levels.

50. The method according to Claim 49, wherein the power data includes a received power level signal.

51. The method according to Claim 49, wherein the power data includes a received signal strength indicator.